



Testimony

Before the Subcommittee on Federal Spending  
Oversight and Emergency Management,  
Committee on Homeland Security and  
Governmental Affairs, U.S. Senate

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## DRINKING WATER

# Status of DOD Efforts to Address Drinking Water Contaminants Used in Firefighting Foam

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Defense Capabilities and Management

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Environment

# GAO Highlights

Highlights of [GAO-18-700T](#), a testimony before the Subcommittee on Federal Spending Oversight and Emergency Management, Committee on Homeland Security and Governmental Affairs, U.S. Senate

## Why GAO Did This Study

According to health experts, exposure to elevated levels of PFOS and PFOA could cause increased cancer risk and other health issues in humans. DOD has used firefighting foam containing PFOS, PFOA, and other PFAS since the 1970s to quickly extinguish fires and ensure they do not reignite. EPA has found elevated levels of PFOS and PFOA in drinking water across the United States, including in drinking water at or near DOD installations.

This statement provides information on actions DOD has taken to address elevated levels of PFOS and PFOA in drinking water at or near military installations and to address concerns with firefighting foam.

This statement is largely based on a GAO report issued in October 2017 ([GAO-18-78](#)). To perform the review for that report, GAO reviewed DOD policies and guidance related to PFOS and PFOA and firefighting foam, analyzed DOD data on testing and response activities for PFOS and PFOA, reviewed the four administrative orders issued by EPA and state regulators to DOD on addressing PFOS and PFOA in drinking water, visited seven installations, and interviewed DOD and EPA officials. This statement also includes updated information based on two 2018 DOD reports to Congress—one on PFOS and PFOA response and one on firefighting foam—as well as discussions with DOD officials.

View [GAO-18-700T](#). For more information, contact Brian J. Lepore at (202) 512-4523 or [leporeb@gao.gov](mailto:leporeb@gao.gov) or J. Alfredo Gómez at (202) 512-3841 or [gomezj@gao.gov](mailto:gomezj@gao.gov).

September 26, 2018

## DRINKING WATER

### Status of DOD Efforts to Address Drinking Water Contaminants Used in Firefighting Foam

## What GAO Found

GAO reported in October 2017 that the Department of Defense (DOD) had initiated actions to address elevated levels of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in drinking water at or near military installations. PFOS and PFOA are part of a larger class of chemicals called per- and polyfluoroalkyl substances (PFAS), which can be found in firefighting foam used by DOD. In May 2016, the Environmental Protection Agency (EPA) issued nonenforceable drinking water health advisories for those two chemicals. Health advisories include recommended levels of contaminants that can be present in drinking water at which adverse health effects are not anticipated to occur over specific exposure durations.

In response to those health advisories, DOD's military departments directed their military installations to (1) identify locations with a known or suspected release of PFOS and PFOA and address any releases that pose a risk to human health, which can include people living outside DOD installations, and (2) test for PFOS and PFOA in installation drinking water and address any contamination above the levels in EPA's health advisories. For example:

- As of August 2017, DOD had identified 401 active or closed military installations with known or suspected releases of PFOS or PFOA.
- The military departments had reported spending approximately \$200 million at or near 263 installations for environmental investigations and responses related to PFOS and PFOA, as of December 2016. According to DOD, it may take several years for the department to determine how much it will cost to clean up PFOS and PFOA contamination at or near its military installations.
- DOD reported taking actions (such as providing alternative drinking water and installing treatment systems) as of August 2017 to address PFOS and PFOA levels exceeding those recommended in EPA's health advisories for drinking water for people (1) on 13 military installations in the United States and (2) outside 22 military installations in the United States.

In addition to actions initiated by DOD, GAO reported in October 2017 that the department also had received and responded to four orders from EPA and state regulators that required DOD to address PFOS and PFOA levels that exceeded EPA's health advisory levels for drinking water at or near four installations.

GAO also reported in October 2017 that DOD was taking steps to address health and environmental concerns with its use of firefighting foam that contains PFAS. These steps included restricting the use of existing foams that contain PFAS; testing foams to identify the amount of PFAS they contain; and funding research on developing PFAS-free foam that can meet DOD's performance requirements, which specify how long it should take for foam to extinguish a fire and keep it from reigniting. In a June 2018 report to Congress, DOD stated that no commercially available PFAS-free foam has met DOD's performance requirements and that research to develop such a PFAS-free foam is ongoing.

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Chairman Paul, Ranking Member Peters, and Members of the Subcommittee:

Thank you for the opportunity to be here today to discuss our report on the Department of Defense's (DOD) attention to drinking water contaminants, part of our body of work on the federal government's environmental liabilities.<sup>1</sup> The federal government is financially liable for cleaning up areas where federal activities have contaminated the environment. Today's hearing addresses federal liability for and procurement of per- and polyfluoroalkyl substances (PFAS), a large group of man-made chemicals that include perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).<sup>2</sup> PFOS, PFOA, and other PFAS can be found in firefighting foam used by DOD since the 1970s for training and emergency response activities to put fires out quickly while also ensuring that they do not reignite.<sup>3</sup>

Exposure to elevated levels of PFOS and PFOA could cause increased cancer risk and other health issues in humans, according to the Agency for Toxic Substances and Disease Registry. The Environmental Protection Agency (EPA) has found PFOS and PFOA in drinking water across the United States, including in drinking water at or near DOD installations. EPA has not regulated PFOS and PFOA in drinking water, but EPA did issue nonenforceable drinking water health advisories for these contaminants in May 2016, which we discuss further in this statement. Addressing PFOS and PFOA contamination represents a potentially significant environmental liability for DOD because the

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<sup>1</sup>In 2017, we added U.S. Government's Environmental Liabilities to our areas identified as government operations with greater vulnerabilities to fraud, waste, abuse, and mismanagement or in need for transformation to address economy, efficiency, or effectiveness challenges. In fiscal year 2016 this liability was estimated at \$447 billion (up from \$212 billion in 1997) and is likely to continue to increase. The Department of Energy is responsible for 83 percent of these liabilities and DOD for 14 percent. Agencies spend billions each year on environmental cleanup efforts but the estimated environmental liability continues to rise. GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, [GAO-17-317](#) (Washington, D.C.: Feb. 15, 2017).

<sup>2</sup>PFOS and PFOA are no longer manufactured in the United States but have been used since the 1940s. PFOS and PFOA have been the most extensively produced and studied PFAS chemicals, and are very persistent in the environment and human body—meaning they do not break down and can accumulate over time.

<sup>3</sup>PFAS have also been used to make consumer products more resistant to stains, grease, and water; keep food from sticking to cookware; and make clothes and mattresses more waterproof.

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regulatory requirements are still evolving, the scientific community is still developing the underlying science, and the scope of work needed for cleanup is not yet known.

In our statement today, we discuss actions DOD has taken to address elevated levels of PFOS and PFOA in drinking water at or near military installations and to address concerns with DOD's firefighting foam. This statement is largely based on our October 2017 report on DOD's efforts to manage contaminants in drinking water.<sup>4</sup> To perform our review for the October 2017 report, we reviewed DOD policies and guidance related to PFOS and PFOA and firefighting foam; analyzed DOD data on testing and response activities for PFOS and PFOA; reviewed four administrative orders issued by EPA and state regulators; visited seven installations; and interviewed DOD and EPA officials. More detailed information on the scope and methodology for that work can be found in the issued report. This statement also includes updated information since our October 2017 report, based on our review of two 2018 DOD reports to Congress—a March 2018 report on the department's response to PFOS and PFOA contamination and a June 2018 report on firefighting foam alternatives—and on our discussions with DOD officials about these issues and their actions in September 2018.<sup>5</sup>

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained

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<sup>4</sup>GAO, *Drinking Water: DOD Has Acted on Some Emerging Contaminants but Should Improve Internal Reporting on Regulatory Compliance*, GAO-18-78 (Washington, D.C.: Oct. 18, 2017). In addition to PFOS and PFOA issues, we reported in October 2017 that DOD had not internally reported all data on compliance with health-based drinking water regulations. We also reported that DOD had not used available data to determine why systems that provide DOD-treated water had different compliance rates from systems that provide non-DOD-treated water. We made five recommendations to improve DOD's reporting and use of drinking water data. DOD concurred with the recommendations and in May 2018 reported actions that were planned or underway to implement them. For example, the military departments stated that they were providing training to their installations on DOD's drinking water reporting requirements. We will continue to monitor DOD's status in implementing these recommendations.

<sup>5</sup>The Deputy Assistant Secretary of Defense for Environment, Safety, and Occupational Health, *Addressing Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)* (March 2018); Under Secretary of Defense for Acquisition and Sustainment, *Department of Defense Alternatives to Aqueous Film Forming Foam Report to Congress* (June 2018).

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provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

EPA regulates drinking water contaminants by issuing legally enforceable standards under the Safe Drinking Water Act that generally limit the levels of these contaminants in public water systems.<sup>6</sup> EPA has issued such regulations for approximately 90 drinking water contaminants. Public water systems, including the DOD public water systems that provide drinking water to about 3 million people living and working on military installations, are required to comply with EPA and state drinking water regulations.

While EPA has not issued legally enforceable standards for PFAS in drinking water, the agency has monitored water systems in the United States for six types of PFAS chemicals—including PFOS and PFOA—in order to understand the nationwide occurrence of these chemicals.<sup>7</sup> This monitoring effort was part of a larger framework established by the Safe Drinking Water Act to assess unregulated contaminants. Under this framework, EPA is to select for consideration from a list (called the contaminant candidate list) those unregulated contaminants that present the greatest public health concern, establish a program to monitor drinking water for unregulated contaminants, and decide whether or not to regulate at least 5 such contaminants every 5 years (called a regulatory determination).<sup>8</sup>

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<sup>6</sup>The term “public water system” refers to the provision of piped drinking water to the public, where the system serves at least 15 service connections or serves an average of at least 25 people at least 60 days out of the year; it does not refer to whether the system is publicly or privately owned.

<sup>7</sup>This monitoring took place from 2013 through 2015 under EPA’s unregulated contaminant monitoring rule program. According to DOD, 63 DOD public water systems were sampled during this time. For more information on EPA’s unregulated contaminant monitoring rule program, see GAO, *Drinking Water: EPA Has Improved Its Unregulated Contaminant Monitoring Program, but Additional Action is Needed*, [GAO-14-103](#) (Washington, D.C.: Jan. 9, 2014).

<sup>8</sup>PFOS and PFOA were placed on the contaminant candidate list in 2009 and again in 2016. EPA met the time frame for publishing the first contaminant candidate list, but has not adhered to the 5-year cycle for subsequent lists.

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EPA's regulatory determinations are to be based on the following three broad statutory criteria, all of which must be met for EPA to decide that a drinking water regulation is needed:

- the contaminant may have an adverse effect on the health of persons;
- the contaminant is known to occur or there is a substantial likelihood that the contaminant will occur in public water systems with a frequency and at levels of public health concern; and
- in the sole judgment of the EPA Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by public water systems.

To date, PFOS and PFOA are unregulated because EPA has not made a positive regulatory determination for these chemicals.

Even when EPA has not issued a regulation, EPA may publish drinking water health advisories. In contrast to drinking water regulations, health advisories are nonenforceable.<sup>9</sup> Health advisories recommend the amount of contaminants that can be present in drinking water—"health advisory levels"—at which adverse health effects are not anticipated to occur over specific exposure durations. Most recently, in May 2016 EPA issued lifetime health advisories for PFOS and PFOA.<sup>10</sup> These advisories set the recommended health advisory level for each contaminant—or both contaminants combined—at 70 parts per trillion in drinking water.<sup>11</sup> According to DOD, the department also considers information in these health advisories when determining the need for cleanup action at installations with PFOS and PFOA contamination.

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<sup>9</sup>EPA has issued administrative orders to address contaminated drinking water based on health advisory levels. We discuss such orders related to PFOS and PFOA later in this statement.

<sup>10</sup>EPA, *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* (May 2016); EPA, *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)* (May 2016). These lifetime health advisories for PFOS and PFOA replaced provisional health advisories that were issued by EPA in January 2009, which set health advisory levels of 200 parts per trillion for PFOS and 400 parts per trillion for PFOA.

<sup>11</sup>One part per trillion is comparable to one drop in a swimming pool covering the area of a football field 43 feet deep.

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## DOD Has Initiated Actions to Address Elevated Levels of PFOS and PFOA in Drinking Water and Concerns with Firefighting Foam

### DOD Has Initiated Actions to Identify, Test, Address, and Respond to Orders from Regulators Regarding PFOS and PFOA in Drinking Water

We reported in October 2017 that, following the release of EPA's lifetime health advisory for PFOS and PFOA in May 2016, each of the military departments directed their installations to

- identify locations with any known or suspected prior release of PFOS and PFOA and to address any releases that pose a risk to human health—which can include people living outside DOD installations; and
- test for PFOS and PFOA in their drinking water and address any contamination above EPA's lifetime health advisory level.

We further reported that, as of December 2016, DOD had identified 393 active or closed military installations with any known or suspected releases of PFOS or PFOA.<sup>12</sup> Since we issued our report, DOD has updated that number to 401 active or closed installations, according to August 2017 data provided in a March 2018 report to Congress on the department's response to PFOS and PFOA contamination.<sup>13</sup>

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<sup>12</sup>We reported in October 2017 that this number included 391 installations identified by the military departments and, according to DOD officials, 2 installations identified by the Defense Logistics Agency. DOD efforts to test for and respond to PFOS and PFOA at overseas installations were outside the scope of our October 2017 report.

<sup>13</sup>The Deputy Assistant Secretary of Defense for Environment, Safety, and Occupational Health, *Addressing Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)* (March 2018). This report was provided in response to language included in House Report 115-200, accompanying a bill for the National Defense Authorization Act for Fiscal Year 2018.

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We stated in our October 2017 report that the military departments had reported spending approximately \$200 million at or near 263 installations for environmental investigations and response actions, such as installing treatment systems or supplying bottled water, as of December 2016.<sup>14</sup>

- The Air Force had identified 203 installations with known or suspected releases of PFOS and PFOA and had spent about \$153 million on environmental investigations and response actions (accounting for about 77 percent of what the military departments had spent on PFOS and PFOA activities as of December 2016). For example, the Air Force reported spending over \$5 million at Peterson Air Force Base in Colorado. During our visit to that installation in November 2016, officials showed us the current and former fire training areas that they were investigating to determine the extent to which prior use of firefighting foam may have contributed to PFOS and PFOA found in the drinking water of three nearby communities. Additionally, the Air Force had awarded a contract for, among other things, installing treatment systems in those communities.
- The Navy had identified 127 installations with known or suspected releases of PFOS and PFOA and had spent about \$44.5 million on environmental investigations and response actions (accounting for about 22 percent of what the military departments had spent on PFOS and PFOA activities as of December 2016). For example, the Navy reported spending about \$15 million at the former Naval Air Station Joint Reserve Base Willow Grove in Pennsylvania.<sup>15</sup> During our visit to that installation in August 2016, officials told us that the Navy was investigating the extent to which PFOS and PFOA on the installation may have contaminated a nearby town's drinking water. At the time, the Navy had agreed to pay for installing treatment systems and connecting private well owners to the town's drinking water system, among other things.
- The Army had identified 61 installations with known or suspected releases of PFOS and PFOA and had spent about \$1.6 million on environmental investigations (accounting for less than 1 percent of

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<sup>14</sup>DOD did not provide updated information on costs for responding to PFOS and PFOA in its March 2018 report to Congress. According to DOD data in our October 2017 report, 204 of the 263 installations where environmental investigations and response actions occurred were active installations, and 59 had been closed under the Base Realignment and Closure process—a process DOD has used to reduce excess infrastructure.

<sup>15</sup>Naval Air Station Joint Reserve Base Willow Grove was closed under the 2005 Base Realignment and Closure round.

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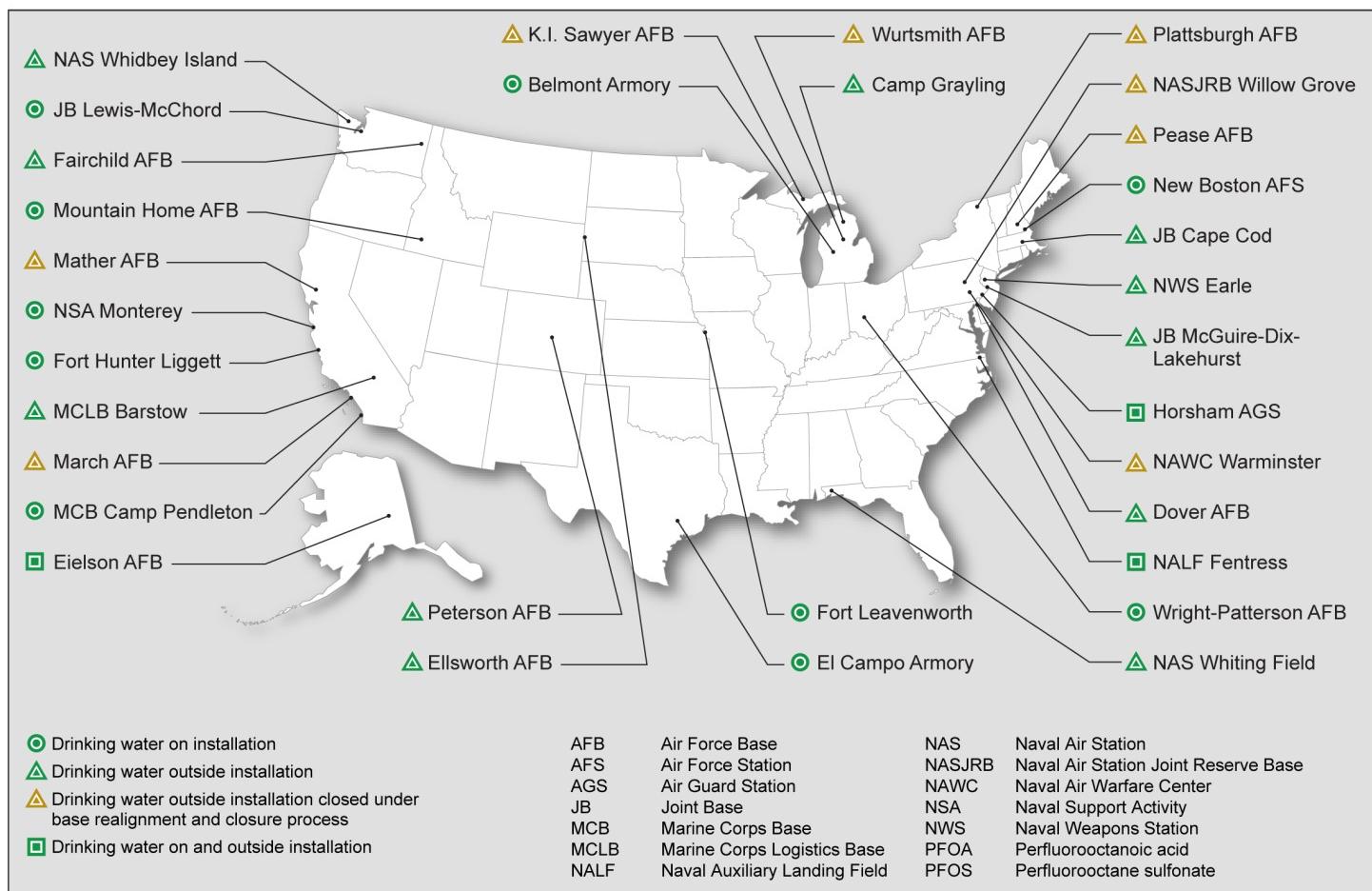
what the military departments had spent on PFOS and PFOA activities as of December 2016), but had not yet begun any response actions. At the time of our October 2017 report, the Army had not yet completed testing its drinking water for PFOS and PFOA.

DOD's March 2018 report to Congress provided updated information on actions taken (such as providing alternative drinking water or installing treatment systems) to address PFOS and PFOA in drinking water at or near military installations in the United States, as shown in figure 1 below. Specifically, DOD reported taking action as of August 2017 to address PFOS and PFOA levels exceeding those recommended in EPA's health advisories for drinking water for people (1) on 13 military installations and (2) outside 22 military installations.<sup>16</sup>

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<sup>16</sup>At the time of our October 2017 report, DOD data showed that the department had initiated actions to address PFOS and PFOA in the drinking water for people (1) on 11 military installations, as of March 2017, and (2) outside 19 military installations, as of December 2016. Two installations (Chanute Air Force Base and Wright-Patterson Air Force Base) that DOD had previously reported to us as locations where actions had been taken to address PFOS and PFOA in drinking water outside the installations were not included in DOD's March 2018 report. DOD officials told us in September 2018 that there are no PFOS and PFOA impacts to drinking water outside these installations.

**Figure 1: Military Installations Where DOD Has Reported Taking Action to Address Elevated Levels of PFOS and PFOA in Drinking Water, as of August 2017**



Source: GAO analysis of Department of Defense (DOD) data; Map Resources (map). | GAO-18-700T

We reported in October 2017 that, in addition to actions initiated by DOD, the department also took action in response to state and federal regulators. DOD responded to four administrative orders requiring that DOD address PFOS and PFOA levels that exceeded EPA's health advisory levels for drinking water. One order was issued by the Ohio Environmental Protection Agency at Wright-Patterson Air Force Base in Ohio, and three orders were issued by EPA at the former Pease Air Force Base in New Hampshire; Horsham Air Guard Station in Pennsylvania;

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and the former Naval Air Warfare Center Warminster in Pennsylvania.<sup>17</sup> For example, at Wright-Patterson Air Force Base, levels of PFOS and PFOA that exceeded EPA's lifetime health advisory levels were found at two wells on the installation in 2016. In response to the order from the Ohio Environmental Protection Agency, the Air Force closed drinking water wells, installed new monitoring wells, and provided bottled water to vulnerable populations on the installation. Additional details on each order and examples of actions by DOD to address the orders were reported on in our October 2017 report.

According to DOD, it may take several years for the department to determine how much it will cost to clean up PFOS and PFOA contamination at or near its military installations. Additionally, DOD officials told us in September 2018 that they believe a legally enforceable EPA drinking water cleanup standard would ensure greater consistency and confidence in their cost estimates because such a standard would give them a consistent target to clean up to. In a January 2017 report on environmental cleanup at closed installations, we recommended that DOD include in future annual reports to Congress best estimates of the environmental cleanup costs for contaminants such as PFOS and PFOA as additional information becomes available.<sup>18</sup> DOD implemented this recommendation by including in its fiscal year 2016 environmental report to Congress (issued in June 2018) an estimate of the costs to respond to PFOS and PFOA.<sup>19</sup>

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<sup>17</sup>Under Section 1431 of the Safe Drinking Water Act, EPA may issue orders necessary to protect human health where a contaminant in a public water system presents an imminent and substantial endangerment and if appropriate state and local authorities have not acted to protect human health. Pub. L. No. 93-523 (1974). These orders may require, among other things, carrying out cleanup studies, providing alternate water supplies, notifying the public of the emergency, and halting disposal of the contaminants threatening human health. The Ohio Environmental Protection Agency has similar authority.

<sup>18</sup>GAO, *Military Base Realignments and Closures: DOD Has Improved Environmental Cleanup Reporting but Should Obtain and Share More Information*, GAO-17-151 (Washington, D.C.: Jan. 19, 2017).

<sup>19</sup>Office of the Under Secretary of Defense for Acquisition and Sustainment, *Defense Environmental Programs Annual Report to Congress for FY 2016* (Washington, D.C.: June 2018).

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## DOD Has Taken Steps to Address Health and Environmental Concerns with Its Firefighting Foam

In our October 2017 report, we found that DOD was taking steps to address health and environmental concerns with its use of firefighting foam that contains PFAS.<sup>20</sup> These steps included restricting the use of existing foams that contain PFAS, testing DOD's current foams to identify the amount of PFAS they contain, and funding research into the future development of PFAS-free foam that can meet DOD's performance and compatibility requirements (see table 1).<sup>21</sup> Some of these steps, such as limiting the use of firefighting foam containing PFAS, were in place. Others, such as researching potential PFAS-free firefighting foams, were in progress at the time of our review.

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**Table 1: Department of Defense (DOD) Steps to Address Concerns about Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) in Firefighting Foam**

Step	Goal	Actions/status
Restricting use of firefighting foam	Following the May 2016 issuance of the Environmental Protection Agency's lifetime health advisory for PFOS and PFOA, the military departments issued policies restricting the use of firefighting foam at their installations.	Actions called for in military department policies: <i>Air Force:</i> Stop routine testing of firefighting equipment unless the released foam can be contained and managed. Treat all releases of firefighting foam with PFOS or PFOA as hazardous material releases. <sup>a</sup> <i>Navy:</i> Stop the uncontrolled release of firefighting foam except in emergency situations. Ensure that any foam that is discharged in a nonemergency situation is contained, captured, and properly disposed of. <sup>b</sup> <i>Army:</i> Prohibit all nonemergency discharges of firefighting foam, to include training and equipment testing. <sup>c</sup>

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<sup>20</sup>Firefighting foam used by DOD contains other types of PFAS, in addition to PFOS and PFOA.

<sup>21</sup>DOD's military specification for firefighting foam outlines performance and compatibility requirements. For example, the specification states how long it should take for foam to extinguish a fire and prevent the extinguished fire from reigniting and requires that firefighting foam approved for use by DOD from one manufacturer be compatible with foam from another manufacturer. At the time of our review, the military specification in place for firefighting foam was DOD, Mil-F-24385F, *Fire Extinguishing Agent, Aqueous Film Forming Foam (AFFF) Liquid Concentrate, for Fresh and Seawater* (Aug. 5, 1994).

<b>Step</b>	<b>Goal</b>	<b>Actions/status</b>
Testing firefighting foam with PFAS	DOD's intent was to eventually replace the existing firefighting foam that contains PFOS and PFOA.	<p>According to DOD, firefighting foams approved for purchase and use by DOD since at least December 2015 do not contain PFOS, but these firefighting foams contain other types of PFAS and may contain PFOA.</p> <p>The Naval Research Laboratory was testing the different types of firefighting foams that were approved for purchase and use by DOD to determine the extent to which they contain PFOA and other types of PFAS.<sup>d</sup> Testing was expected to continue until late 2017 or 2018.</p> <p>Navy and Army officials said that they planned to wait for final testing results before deciding whether to select a specific firefighting foam to replace the foam used at their installations. The Air Force, however, had already selected a specific foam for use at its installations. This foam contains PFAS but, according to the Air Force, does not contain PFOS and contains little or no PFOA.</p> <p>Officials said that all Air Force installations in the continental United States had received this new foam.</p>
Funding firefighting foam research	DOD was funding research into the development of PFAS-free firefighting foam because DOD believes that such a foam would significantly reduce the environmental impact of fire suppression training and operations, while maintaining the safety of personnel from fire hazards.	<p>In October 2015, DOD's Strategic Environmental Research and Development Program issued a statement of need calling for proposals to develop a PFAS-free firefighting foam that can meet DOD's performance requirements and be compatible with existing foams and equipment.</p> <p>In fiscal year 2017, DOD funded three research projects that responded to the statement of need—one led by the Naval Air Systems Command, one led by the Naval Research Laboratory, and one led by a private firefighting foam manufacturer—with an estimated total cost of \$2.5 million and an estimated completion date of 2020.</p>

Source: GAO analysis of DOD data. | GAO-18-700T

<sup>a</sup>Office of the Assistant Secretary of the Air Force for Installations, Environment, and Energy Memorandum, *SAF/IE Policy on Perfluorinated Compounds (PFCs) of Concern* (Aug. 11, 2016).

<sup>b</sup>Office of the Assistant Secretary of the Navy for Energy, Installations, and Environment Memorandum, *Aqueous Film Forming Foam (AFFF) Control, Removal, and Disposal* (June 17, 2016).

<sup>c</sup>Assistant Chief of Staff of the Army for Installation Management Memorandum, *Limiting Use of Aqueous Film Forming Foam* (June 29, 2016).

<sup>d</sup>Navy officials told us during our review that they were testing the firefighting foam products that were currently included on DOD's qualified product list, which is the list of firefighting foams that have been approved for purchase and use by DOD.

DOD's military specification for firefighting foam, which outlines performance and compatibility requirements, also requires that firefighting foam purchased by the department contain PFAS. We reported in October 2017 that, according to DOD, there was no PFAS-free firefighting foam that could meet DOD's performance and compatibility requirements. As a result, the Navy—which is the author of the military specification—had no plans to remove the requirement for firefighting foam to contain PFAS. However, Navy officials told us during our review that if a PFAS-free foam were to be developed that could meet DOD performance and

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compatibility requirements the Navy would make any necessary revisions to the military specification at that time. Navy officials also said during our review that they were planning to revise the military specification to set limits for the amount of PFAS that are allowed in firefighting foam, following their testing on the amounts of PFOS, PFOA, and other PFAS found in foam used by DOD.

In June 2018, DOD reported to Congress that its military specification for firefighting foam was amended to set a maximum level of PFOS and PFOA (800 parts per billion).<sup>22</sup> DOD officials told us in September 2018 this maximum level applies to the amount of those chemicals in firefighting foam concentrate before it is mixed and diluted with water to create firefighting foam.<sup>23</sup> The DOD officials also said that 800 parts per billion is the lowest level of PFOS and PFOA that can be detected in firefighting foam concentrate by current testing methods and technologies, but DOD is working with foam manufacturers and laboratories to achieve lower detection limits. According to the June 2018 report, DOD plans to establish lower limits for PFOS and PFOA in firefighting foam in late 2018. The June 2018 report reiterated that, according to DOD, no commercially available PFAS-free foam has met the performance requirements of the military specification, and the report also stated that DOD-funded research efforts to develop a PFAS-free foam that can meet performance requirements are still ongoing.

Chairman Paul, Ranking Member Peters, and Members of the Subcommittee, this completes our prepared statement. We would be pleased to respond to any questions that you may have at this time.

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<sup>22</sup>Under Secretary of Defense for Acquisition and Sustainment, *Department of Defense Alternatives to Aqueous Film Forming Foam Report to Congress* (Washington, D.C.: June 2018).

<sup>23</sup>This level is distinct from EPA's lifetime health advisory levels for PFOS and PFOA (70 parts per trillion), which apply to drinking water and not to, for example, firefighting foam concentrate.

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## GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this report, please contact us at Brian J. Lepore, (202) 512-4523 or [leporeb@gao.gov](mailto:leporeb@gao.gov) or J. Alfredo Gómez, (202) 512-3841 or [gomezj@gao.gov](mailto:gomezj@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Other individuals who made key contributions to this statement include Maria Storts (Assistant Director), Diane B. Raynes (Assistant Director), Michele Fejfar, Karen Howard, Richard P. Johnson, Mae Jones, Amie Lesser, Summer Lingard-Smith, Felicia Lopez, and Geoffrey Peck.

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